

**COMPETENCY MODEL FOR
MECHANICAL ENGINEER
CLASS CODE 7558**

The following competencies have been identified as those that best separate superior from satisfactory job performance in the class of **MECHANICAL ENGINEER**. (Numbers refers to the order of competencies in the Competency Bank.)

- 4. Analytical Ability
- 8. Safety Focus
- 20. Job Knowledge
- 28. Supervision
- 35. Teamwork
- 47. Written Communication
- 48. Shares Knowledge and Information
- 49. Project Management
- 58. Industry Knowledge

On the following pages are descriptions of each competency, including a definition, the level of the competency required for the class (*italicized*, **bolded**, and underlined), examples of behavioral indicators, and satisfactory and superior performance levels.

4. ANALYTICAL ABILITY – Identifies, obtains, and evaluates relevant information to establish relationships or patterns, cite causes, and reach logical conclusions.

Level of Competency Required by Job:

- Level 1: Recognize similarities/differences in current situation to those previously encountered and is guided accordingly. Apply existing policies correctly. Ask pertinent questions or otherwise seek additional information to formulate appropriate response.
- Level 2: **Consider multiple, varied factors when evaluating a situation or issue. Seek additional information to provide further insight. Reach conclusions that logically follow from the information obtained.**
- Level 3: Consider a multitude of diverse factors, their interrelationships, the perspectives of others, alternative courses of action and their likely ramifications when evaluating information to reach a conclusion.

Examples of Behavioral Indicators:

- Obtains the necessary amount of relevant information.
- Recognizes the impact of each type of information on conclusions.
- Evaluates the quality/source of information when considering it.
- States the shortcomings of the information and, therefore, the analysis.

Performance Levels:

Satisfactory

Recognizes available relevant information, seeks additional information to consider, and reaches a conclusion. Provides sound, convincing justification for conclusions, citing relevant data and facts.

Superior

Uses a great deal of existing and obtained information and data to develop and evaluate alternatives and arrive at a final conclusion. Provides compelling arguments in support of conclusions.

8. SAFETY FOCUS – Performs work in a way that minimizes risk of injury to self or others.

Level of Competency Required by Job:

- Level 1: Maintain awareness of unsafe conditions and actions to avoid injury.
- Level 2: Follow safety rules/procedures; avoid known hazards in the work environment.
- Level 3: **Carefully follow safety rules and procedures and consistently use all necessary safety equipment.**

Examples of Behavioral Indicators:

- Wears seat belt.
- Ensures safe physical work environment by taking actions such as eliminating unstable stacks of materials, closing drawers so filing cabinets will not tip over, and keeping pathways clear of tripping hazards.
- Reviews safety procedures before beginning each job with known hazards.
- Follows safety procedures while performing work even when it takes more time.
- Uses safety equipment such as goggles, gloves, and earplugs as required or warranted.
- Frequently checks safety equipment for proper condition and operation.

Performance Levels:

Satisfactory

Maintains awareness of personal safety to avoid injury or property damage during all work activities.

Superior

“Safety first.” Places avoidance of injury or property damage above all other job requirements. Mentions the need to follow safe work practices to co-workers. Actively seeks ways to avoid injury.

20. JOB KNOWLEDGE – Knows information required to perform a specific job. Includes both widely available courses of study (for example, chemistry, human resources management, graphic arts) and City-specific information (parking regulation and ticketing practices; purchasing procedures; provisions of the City Charter).

Level of Competency Required by Job:

- Level 1: Knowledge acquired after hire in a brief orientation, short training program, or through on-the-job training.
- Level 2: Knowledge acquired through an apprenticeship or extensive training program, or long duration of job performance.
- Level 3: **Knowledge acquired through a prolonged external course of study and/or extensive training and experience within the City.**

Examples of Behavioral Indicators:

- Performs work correctly/avoids technical (job content related) errors.
- Answers technical questions about work accurately.
- Asks few technical questions about the performance of routine work activities.
- Offers advice (“coaching”) to new employees regarding their work.
- Develops training programs for other employees.

Performance Levels:

Satisfactory

Sufficient job knowledge to perform work correctly independently. Answers technical questions about work correctly.

Superior

Expertise in technical job information sufficient to serve as a resource to others. May develop training manuals/programs and/or give internal and/or external presentations related to work.

Mechanical Engineer (7558)
Job Knowledge Areas

1. Knowledge of mechanical, electrical, civil, and structural engineering and related subjects, such as:
 - a. metallurgy, metal fabrication processes, erosion, corrosion, scaling, and cathodic protection problems and solutions;
 - b. fluid mechanics;
 - c. heating, ventilating, air conditioning, and building maintenance (e.g., fire protection techniques and equipment, building energy performance modeling);
 - d. general environmental engineering;
 - e. water treatment, water quality analysis, and boiler water chemistry;
 - f. quality assurance and control methods, such as destructive and non-destructive tests of materials;
 - g. thermodynamics, heat transfer, combustion, combustion generated emissions, and fuel chemistry;
 - h. static and dynamic mechanics; and/or
 - i. seismic design (includes various code requirements)sufficient to assign, delegate, and review the work and designs of subordinates, while providing technical support.

2. Knowledge of equipment and system functions, such as:
 - a. hydraulic, pneumatic, and electronic control systems;
 - b. instrumentation and controls of boilers, turbines, and generators and other equipment, monitoring processes, such as water fluid flow, pressure, temperature, valve position, start-stop operation, and pumping;
 - c. types and applications of valves, pumps, and other mechanical engineering equipment;
 - d. renewable energy equipment (e.g., wind, geothermal, solar, biomass);
 - e. air quality equipment;
 - f. cooling tower systems and environmental control systems;
 - g. testing principles and methods of improving efficiency of generation systems or energy use;
 - h. quality assurance and control methods (e.g., destructive and non-destructive tests of materials);
 - i. key performance indicators; and/or
 - j. a wide variety of mechanical systems (e.g., HVAC, central systems, fire suppression and sprinkler) and equipment and their operational testing requirementssufficient to revise and approve quality assurance reports and proposed appropriate testing methods, while reviewing and approving proposed designs and design modifications of subordinates or making recommendations to improve system performance.

3. Knowledge of codes and standards, such as ASME, ANSI piping, California Title 20 and 24, and City Fire code relating to equipment and facilities, and the sources of information applied to the above sufficient to ensure designs meet the applicable codes.

4. Knowledge of regulations regarding safety of personnel located in shops, operating facilities, offices, and out in the field, and safety codes, such as CAL/OSHA, sufficient to ensure work is performed safely and in compliance with regulations.
5. Knowledge of engineering economic principles sufficient to prepare and approve economic analysis to determine the cost benefit of proposed engineering alternatives.
6. Knowledge of the bid process on material, construction, services, and related items sufficient to write, evaluate, negotiate, and recommend awards for bids, administer contracts, and verify specifications.
7. Knowledge of design, construction procedures and techniques related to workflow (e.g., work orders, drawings), mechanical systems and equipment sufficient to effectively manage the schedule and budget of a mechanical engineering project.
8. Knowledge of computer applications used for contracts, project budget, studies, reports, and mechanical engineering projects, such as Microsoft Suite and other drafting software as needed, sufficient to prepare plans, designs, and specifications for mechanical engineering projects.

28. SUPERVISION – Ability to assume direct responsibility for all aspects of the performance of a work group, which requires knowledge and/or ability in the areas of:

- Planning and goal setting
- Creating a safe and positive work environment
- Establishing standards and training employees
- Motivating employees and team building
- Performance Management (assigning, monitoring, facilitating, reviewing and evaluating work, and providing feedback)
- Supporting and developing employees through delegation and participation
- Taking disciplinary action including progressive discipline
- Provisions of employees' MOU's and handling grievances
- Legal requirements including EEO, ADA, FLSA, FMLA, and Workers' Compensation provisions
- Civil Service Commission Rules and Policies related to the management of employees
- Administrative Code provisions related to the management of employees
- Budget processes sufficient to request and justify expenditures in a correct and timely manner

Level of Competency Required by Job:

Level 1: Supervises small workgroup of employees performing the same or highly related work.

Level 2: **Supervises a larger workgroup of employees performing various types of work.**

Level 3: Supervises employees including provision of coaching and advice to subordinate supervisors.

Examples of Behavioral Indicators:

- Plans, assigns, and monitors work progress.
- Trains employees to do work.
- Evaluates work and gives positive and negative feedback.
- Displays knowledge of legal requirements including applicable Federal and State laws, Administrative Code provisions, Civil Service Commission Rules and Policies, and MOU provisions.

Performance Levels:

Satisfactory

Proficiency in supervision sufficient to supervise a workgroup in terms of task orientation, interpersonal concerns, and personnel administration.

Superior

Proficiency in supervision sufficient to serve as a resource to others and/or represent department position in a public.

35. TEAMWORK – Interacts effectively with others to achieve mutual objectives; readily offers assistance to others to facilitate their goal accomplishment.

Level of Competency Required by Job:

- Level 1: Work effectively as a member of a work unit or project team. Readily offer assistance to others when they have too much work or have too little.
- Level 2: **Work effectively as a team member in which different people have different roles/responsibilities and perspectives. Identify points for collaboration with co-workers; readily offer and request assistance.**
- Level 3: Work effectively as a part of an interdependent team (your work gets done only if the work of the whole team is done; evaluation of team performance is more relevant than individual performance).

Examples of Behavioral Indicators:

- Discusses work-related matters with co-workers.
- Offers and requests assistance readily.
- Offers and is receptive to suggestions.
- Identifies problems with workflow that will prevent team from accomplishing its goals.
- Provides constructive criticism and feedback to team members to improve overall functioning of team.
- Assigns credit to team for accomplishments.

Performance Levels:

Satisfactory

Cooperates with co-workers and fulfills responsibilities as a member of a project team. Maintains a focus on common objectives and offers and requests assistance readily.

Superior

Sees the team as a whole; acknowledges that performance of the team is what in reality is evaluated by others. If anyone fails, everyone on the team fails.

47. WRITTEN COMMUNICATION – Communicates effectively in writing.

Level of Competency Required by Job:

- Level 1: Write notes/e-mails. Completes forms with some open-ended responses (sentences).
- Level 2: **Write letters, articles/reports, and/or detailed descriptions of activities/occurrences.**
- Level 3: Write lengthy reports, instruction manuals, in-depth analyses/reviews of complex issues and/or articles for publication. Reviews the written work of others.

Examples of Behavioral Indicators:

- Writing includes the necessary information to convey the intended message.
- Sufficiently few errors in spelling, punctuation, grammar to not interfere with the intended message or distract the reader.
- Little editing or re-writing needed to produce a final product.
- Composes materials efficiently.
- Information is presented in a well organized manner.
- Tone and degree of formality are appropriate to the purpose and audience.

Performance Levels:

Satisfactory

Writes material that clearly communicates the necessary information; needs little editing.

Superior

Precisely uses words and organizes information in a way that enhances presentation of the message. Virtually no editing needed.

48. SHARES KNOWLEDGE AND INFORMATION – Conveys all information relevant to each involved party in a thorough and timely manner.

Level of Competency Required by Job:

- Level 1: Provide job-related information as it becomes available to others who are likely to need it or to whom it might be helpful.
- Level 2: **Keep all involved parties informed of work/project progress and other new information. Tailors content, level of detail, and timing of information provided to the perspective of each recipient.**
- Level 3: Recognize different needs for different information and provide all affected parties with a description of the “big picture” as well as the breadth and detail of information relevant to their perspective.

Examples of Behavioral Indicators:

- Provides thorough explanations with all relevant details.
- Uses multiple means of communicating (e.g., e-mail, telephone, meetings).
- Provides status reports of work/project progress to all involved parties.
- Informs others of changes at the earliest feasible time.
- Uses multiple addressees and “copies” others so all parties see exactly the same information and know who already has been informed.
- Draws from job knowledge and work experience to provide thorough descriptions and explanations.

Performance Levels:

Satisfactory

Readily communicates new, job-related information to all employees to whom it is relevant. Provides a level of detail and explanation appropriate to the recipient.

Superior

Ensures that all involved parties are provided the maximum amount of information feasible in as timely a manner as possible to facilitate work/project status. Shares job knowledge and experience to serve as a mentor or coach to others.

49. PROJECT MANAGEMENT – Anticipates and plans for all aspects of a multi-faceted, discrete endeavor to ensure resources are available and actions are taken at proper times for successful completion.

Level of Competency Required by Job:

- Level 1: Plan, coordinate, and oversee accomplishment of multi-step projects involving other employees.
- Level 2: **Design, plan, coordinate, and manage large, multi-faceted projects involving employees from various segments of the organization representing different perspectives.**
- Level 3: Design, plan, secure approval and resources, and manage large-scale, complex projects involving many employees representing a large number of diverse segments of the organization and perspectives, which may at times be in conflict.

Examples of Behavioral Indicators:

- Establishes project plans that gain management acceptance.
- Establishes realistic timeline and estimates of resources needed.
- Assembles appropriate team with complementary skills to efficiently execute all portions of a project.
- Secures necessary resources for successful project completion.
- Clearly designates roles/responsibilities/accountability.
- Addresses failure to perform or other problems in a timely and effective manner to minimize negative impact.

Performance Levels:

Satisfactory

Establishes acceptable project plan; assembles team with required skills; establishes personal responsibility/accountability. Ensures the necessary time and resources are available.

Superior

Designs efficient project plan to maximize benefits and minimize use of resources. Designates precise mix of people to best accomplish the project. Completes on time, with resources allocated.

58. INDUSTRY KNOWLEDGE – Knows sources of information (publications, websites, professional associations), college programs, consultants, vendors, and peers within field of endeavor; accesses them when needed.

Level of Competency Required by Job:

- Level 1: Can locate job-related information from external sources when necessary.
- Level 2: **Read job-related publications and know/may be a member of professional associations. Some familiarity with college programs, consultants, vendors, and/or others in the field.**
- Level 3: Subscribe to job-related publications and is a member of professional association(s). Know many college programs, consultants, and vendors, and has a well-developed network of peers within the field.

Examples of Behavioral Indicators:

- Reads/subscribes to job-related publications.
- Knows consultants/vendors in the field including their products/services and reputation.
- Attends conferences or other job-related training/presentations.
- Makes presentations to professional associations.
- Has contacts on college faculties to call upon if needed.

Performance Levels:

Satisfactory

Aware of external resources available in the field. Can locate and obtain materials and/or locate and contact professional associations, consultants, vendors, or peers if necessary.

Superior

Knows many external resources in the field, including publications, educational programs, consultants, and vendors. Has a well-established network of peers. Belongs to professional associations and attends conferences or other training sessions. Provides research results and/or benchmarking data to the field.